Lesson 33 Objective: SWBAT solve quadratic equations with complex roots.

Kickoff- Solve the quadratic equations.

1) $3x^2 - 16x - 7 = 5$

2) $x^2 + 16x + 6 = 7$

$-6 \quad -6$

$x^2 + 16x + 64 = 1 + 64$

$\sqrt{(x+8)^2} = \sqrt{65}$

$x + 8 = \pm\sqrt{65}$

$-8 \quad -8$

$x = -8 \pm \sqrt{65}$

① $3x^2 - 16x - 7 = 5$

$-5 \quad -5$

$3x^2 - 16x - 12 = 0$

$3x^2 - 18x + 2x - 12 = 0$

$3x(x-6) \quad 2(x-6)$

$(3x+2)(x-6) = 0$

$3x + 2 = 0 \quad x - 6 = 0$

$x = -2/3 \quad x = 6$

Solving Quadratics with Imaginary Roots

Try This: Simplify

1) $\sqrt{-9}$ $3i$

2) $\sqrt{-75}$ $5i\sqrt{3}$

3) $\frac{8+10i}{4}$ $2 + \frac{5}{2}i$

Solving Quadratic Equations

1. Factoring (when possible)
2. $\sqrt{\ }$ each side $5x^2 = 125$
3. Completing the Square ($a = 1$ and b is even)
4. Quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Examples:

1) $x^2 - 8x + 20 = 0$

$-20 \quad -20$

$x^2 - 8x + 16 = -20 + 16$

$\sqrt{(x-4)^2} = \sqrt{-4}$

$x - 4 = \pm 2i$

$+4 \quad +4$

$x = 4 \pm 2i$

2) $4x(x-2) + 6 = 0$

$4x^2 - 8x + 6 = 0$

$a = 4$

$b = -8$

$c = 6$

$x = \frac{8 \pm \sqrt{(-8)^2 - 4(4)(6)}}{2(4)}$

$x = \frac{8 \pm \sqrt{-32}}{8}$

$x = \frac{8 \pm 4i\sqrt{2}}{8}$

$x = 1 \pm \frac{i\sqrt{2}}{2}$

3) $2x^2 - 6x = -5$

$x = \frac{3}{2} \pm \frac{i}{2}$

4) $2x(x-2) + 5 = 0$

$x = \frac{2 \pm i\sqrt{6}}{2}$

5) $12x - 8 = 5x^2$

$\frac{6}{5} \pm \frac{2i}{5}$

6) $-x^2 + 4x - 5 = 0$

$-1 \quad -1 \quad -1 \quad -1$

$x^2 - 4x + 4 = -5 + 4$

$\sqrt{(x-2)^2} = \sqrt{-1}$

$x - 2 = \pm i$

$+2 \quad +2$

$x = 2 \pm i$